

Joint Load Transfer and Slab Loss of Support Analysis

Description:

This study was conducted to analyze joint load transfer and slab loss of support of two different Portland Cement Concrete pavement (PCCP) designs. MoDOT's newly adopted PCCP design, 12" non-reinforced PCCP with 15 foot joint spacing and tied shoulders, is compared to a pavement representing the old design, 10" reinforced PCCP with 61.5 foot joint spacing and non-tied shoulders. The design characteristics are described in the following table.

Characteristic	Rte 54 - Audrain Job # J3P0104B	Rte 54 - Callaway Job # J5P0411C	Rte 63-Callaway Job # J5P0721	Fulton Bypass Job # J5P0409
Pavement Thickness	10 inch	12 inch	12 inch	12 inch
Joint Spacing	61.5'	15'	15'	15'
Shoulders	Not Tied	Tied	Tied	Tied
Base	4" Type 3	4" Type 3	2' Rock Fill	4" Type 3
Loading Repetitions (ESAL) As of Test Date	477,000	399,000	114,812	511,370

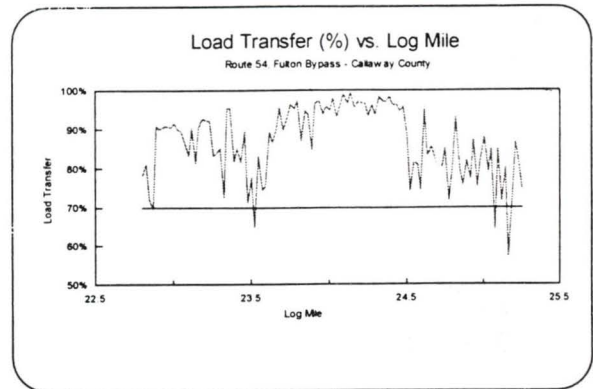
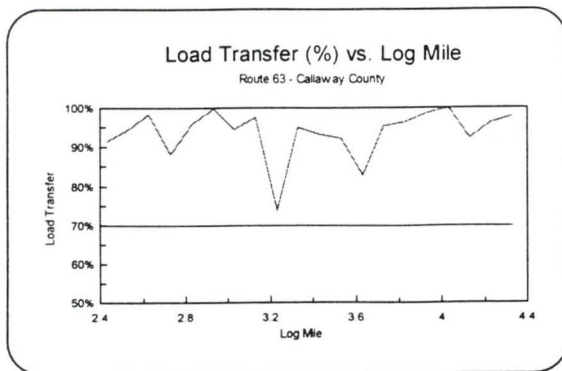
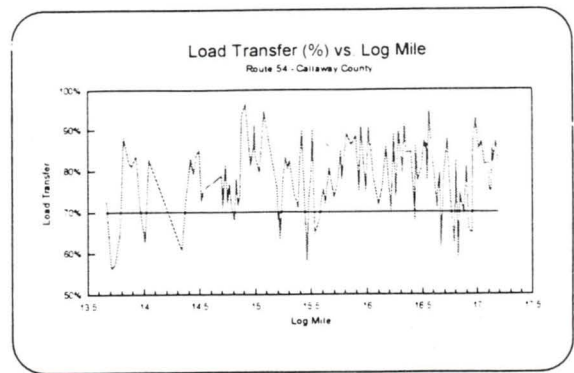
Procedure:

MoDOT's Falling Weight Deflectometer was used to analyze the pavement performance of the four recently constructed pavement sections. The center deflection values, deflection basin areas, and corner deflection values were plotted for all pavements. The NCHRP Void Size Estimation Procedure was used to find slab loss of support. The joint load transfer efficiency was also plotted vs. log mile for each project as shown in the following figures.

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Conclusion:

The center deflection and deflection basin area plots show that the pavements are in good structural condition. According to the Void Size Estimation Procedure, none of the pavements exhibited any sign of voids beneath the pavement. The major difference was reflected in the joint load transfer values. The Route 54, Callaway County pavement's load transfer values were irregular, with nearly 20% of the joints being below the limit for good load transfer (70% load transfer). The other pavements' values were more constant and higher on the average. This report discusses the possible explanations for the low load transfer and concludes that the 15' joint spacing is not at fault and supports the opinion that the saturated subgrade/base (as described in the report) could be the cause for the poor results.

Additional research into the effects of subgrade moisture and/or drainable bases, such as 2 foot rock fill, is recommended.

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